Crop Ontology: Integration of Standard Variables

P1288

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The Crop Ontology development

Trait Dictionary template

- Developed by the Crop Ontology and the Integrated Breeding Platform **to support the creation of ontologies**
- Populated by breeders with their **traits**, observation **methods** and reporting **scales**

The **Breeding Management System** uses the Trait Dictionaries to:

- Create breeders' fieldbook
- Annotate and store breeders' data

http://integratedbreeding.net/

The **Crop Ontology online tool** features:

- The **publication** of ontologies from the Trait Dictionary template or OBO files
- The **browsing** of term definitions and relations
- An **Application Programming Interface** to provide databases and web applications with ontologies in Excel, OBO, RDF, JSON formats

http://www.cropontology.org
(https://github.com/bioversity/Crop-Ontology)

Improvement in phenotype annotation

To annotate phenotypes, Crop Ontology supplies breeders with:

- **Traits** i.e. the observed plant entities (e.g. leaf, grain) and attributes (e.g. color, weight)
- **Methods** i.e. the protocols to observe the trait
- **Scales** i.e. the units or categories that can express the trait observation

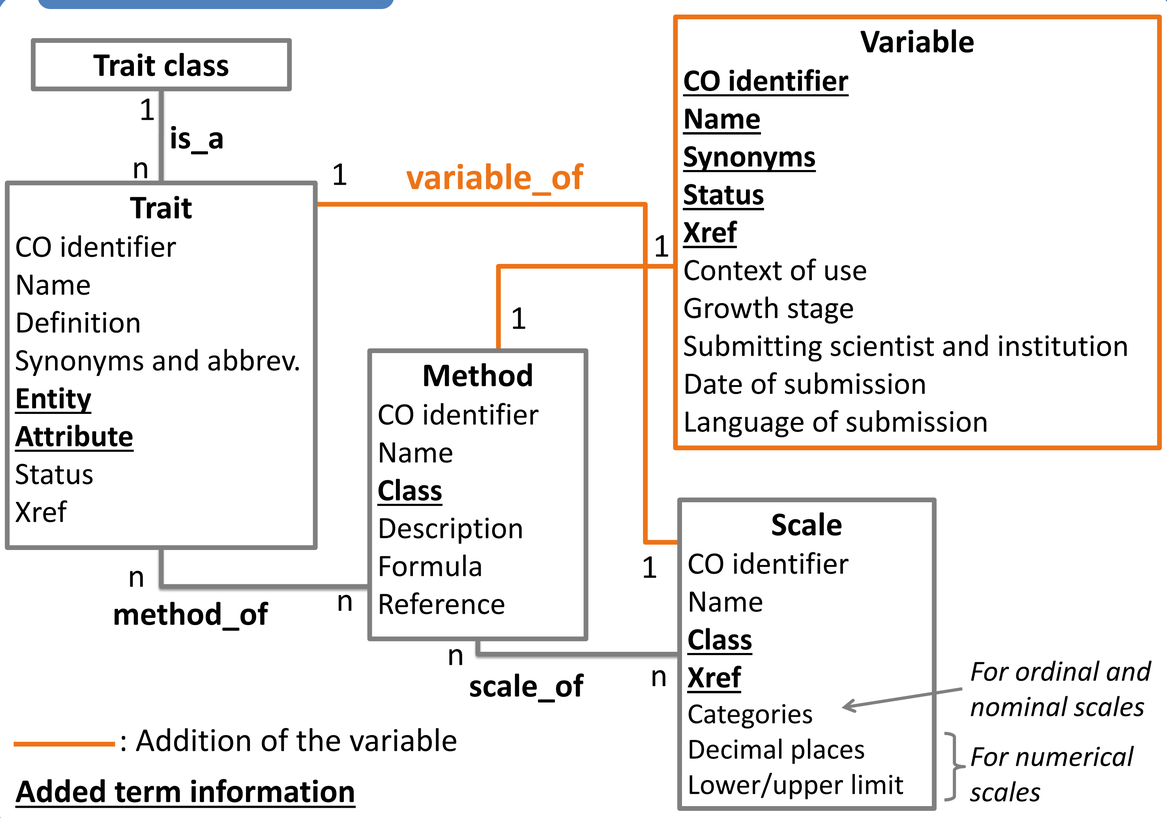
Thus, a plant phenotype had to be annotated with 3 identifiers for the trait, the method and the scale, respectively. Yet, breeders' fieldbooks and phenotype databases are often designed **to annotate a datapoint with only one identifier**.
In May 2015, Crop Ontology has consequently been revised to integrate the variables.

1 **Variable** = {1 Trait, 1 Method, 1 Scale}

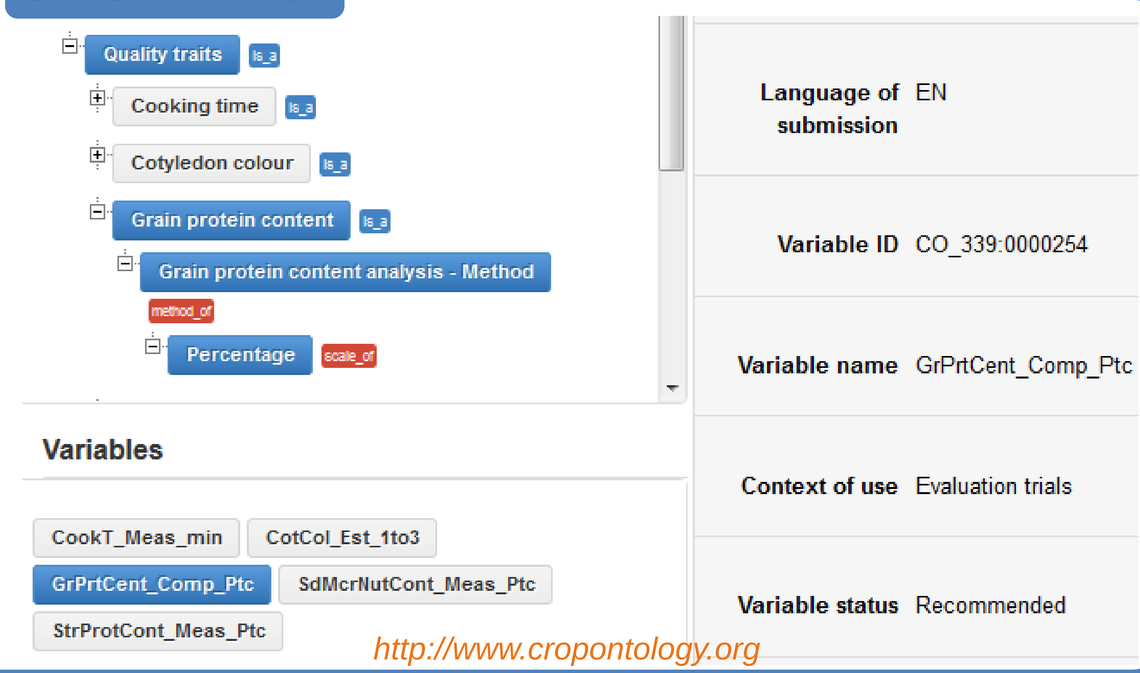
Examples of variables:

Variable	Trait	Method	Scale
PltHt_Meas_cm	Plant height i.e., the distance from ground level to the tip of the spike	Measure the height of a plant with a ruler	cm
PltHt_Av_cm		Compute the average of 5 to 10 individual plant height measurements	cm
PltHt_Est_0to5		Visually estimate the average plant height	Score
GW100_Meas_g	100 grain weight i.e., the weight of 100 dehulled grains	Weigh a defined number of grains. Then, divide the weight by the number of grains and multiply by 100	g per 100 grains

CO schema upgrade

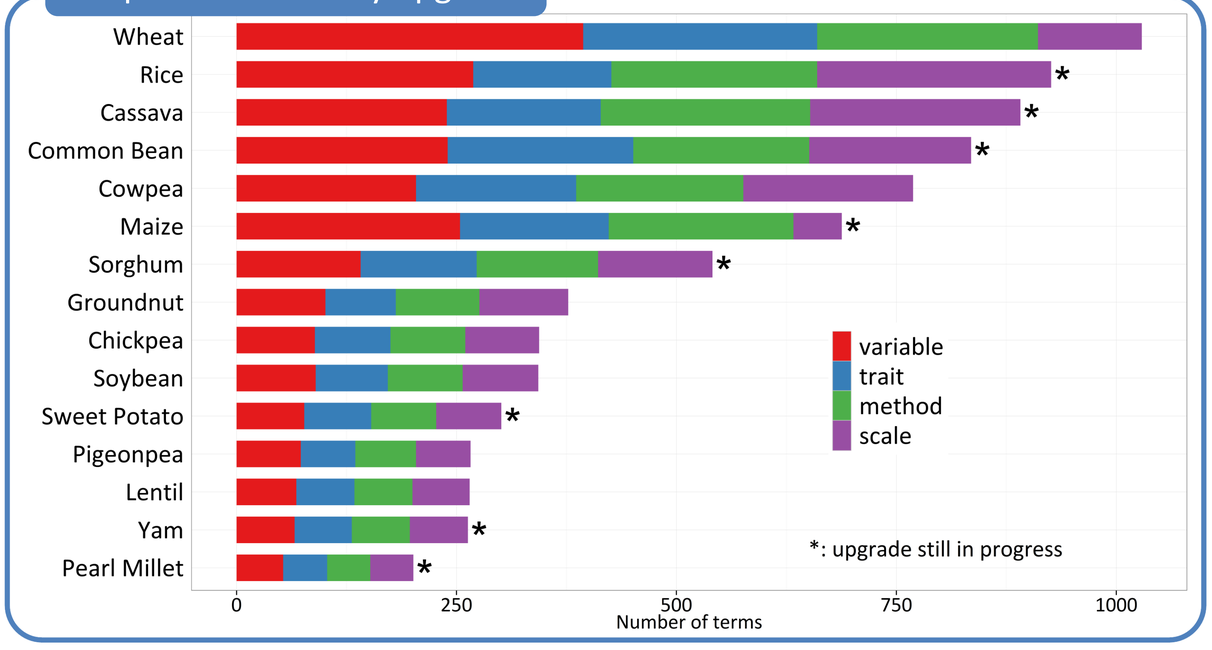


Online visualization



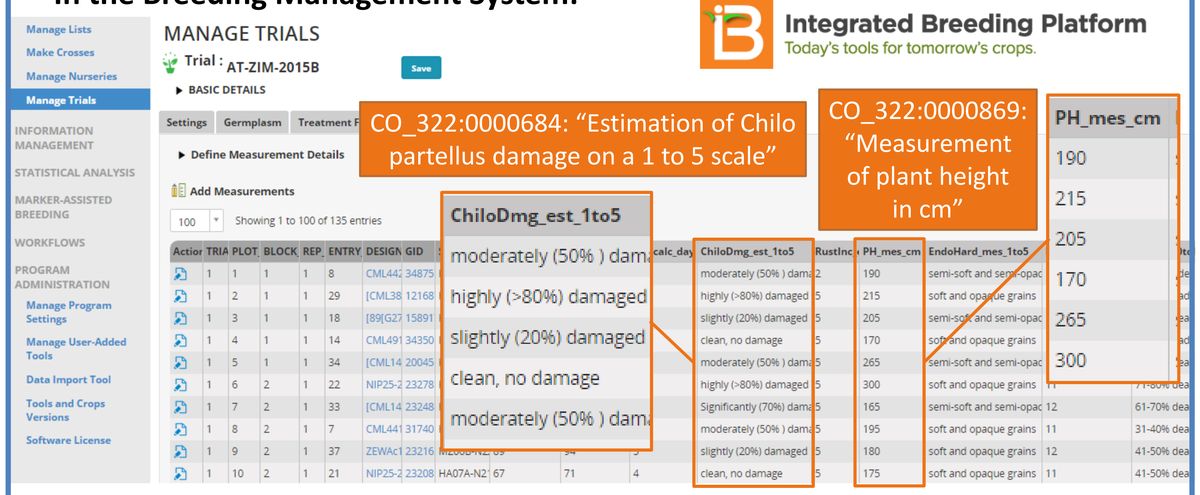
http://www.cropontology.org

Crop Trait Dictionary upgrade

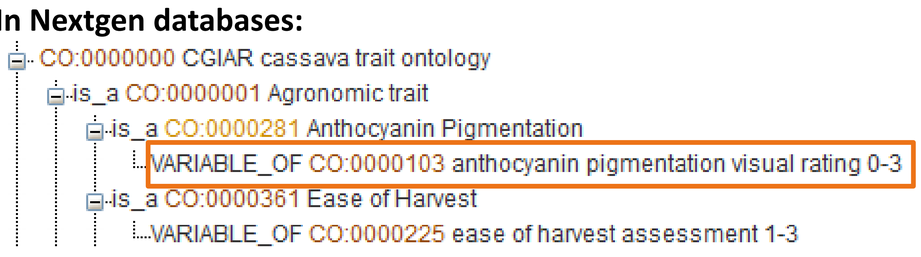


Data annotation with variables

In the Breeding Management System:



In Nextgen databases:



NEXTGEN CASSAVA

Next Steps

- Complete the upgrade of the Trait Dictionaries
- Start upgrading the Trait Dictionaries of banana and potato
- Upload the Trait Dictionaries in the Breeding Management System 4.0
- Release curation guidelines
- Add crops: cacao, faba bean, sunflower, forage, grape, beetroot, woody plants
- Translate the Trait Dictionaries into relevant languages

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CGIAR RESEARCH PROGRAM ON Dryland Cereals · Research Program on Rice Global Rice Science Partnership · RESEARCH PROGRAM ON Grain Legumes · RESEARCH PROGRAM ON Maize · RESEARCH PROGRAM ON Roots, Tubers and Bananas · RESEARCH PROGRAM ON Water, Land and Ecosystems · RESEARCH PROGRAM ON Wheat · CCAFS

Crop Ontology for agricultural data